

# Tracking Studies

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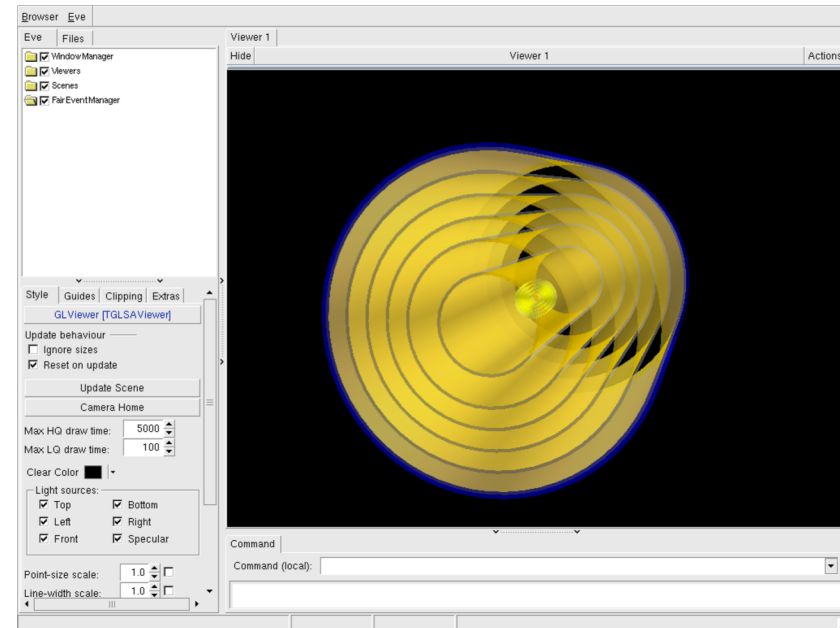
Nick Lukow

August 26, 2019

eRD6 Meeting

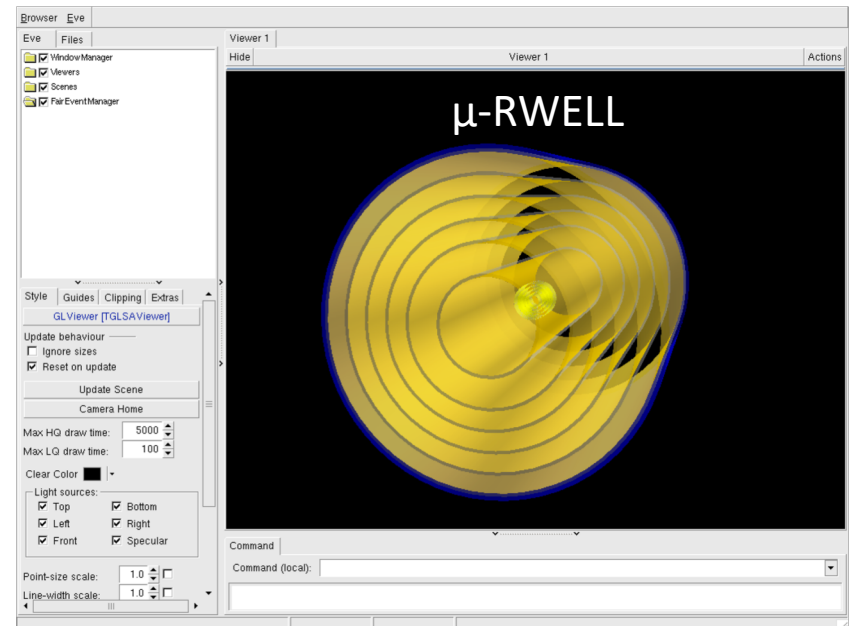
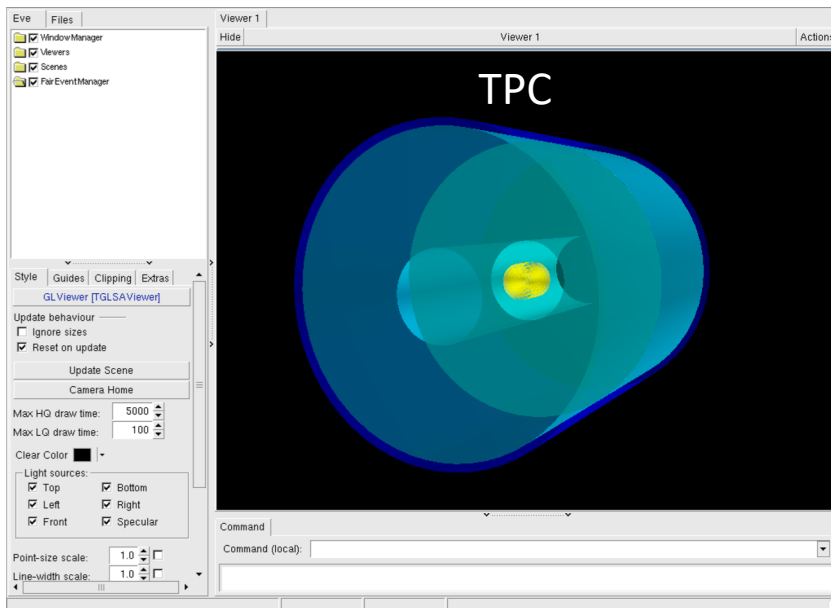
# Overview

- Spent a few days working with Alexander learning how to use the code for the simulations.
- Some scripts are used to generate the detector geometry
- A simulation script generates the tracks, which are thrown through the detector
- The hits in the detector are smeared for the uRWELL set up (using user input resolution)
- The track is then reconstructed from the smeared hits
- Implemented a “test layer” that is used to extract the reconstructed track parameterizations outside the tracker (near where the DIRC would be)
  - Comparing the reconstructed track parameterizations and the monte carlo track parameters gives us an idea of the resolution of the tracker



# Tracking Study

- First use the simulation of the TPC and determine the tracking resolution for various track angles and momenta.
- Then do the same thing for the u-RWELL shell tracker.
  - Change the smearing to various levels to determine what longitudinal/azimuthal resolution the uRWELL shells will need in order to be as effective as the TPC.

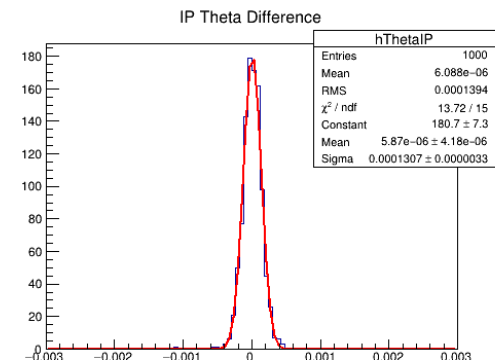
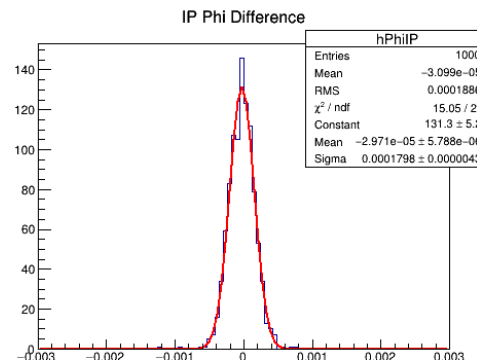
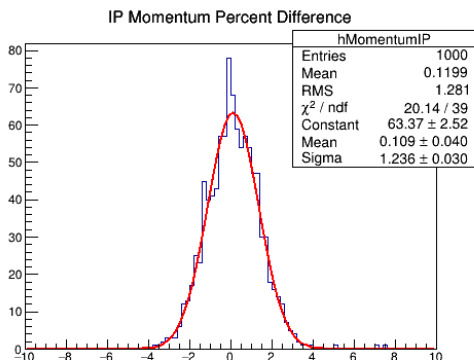
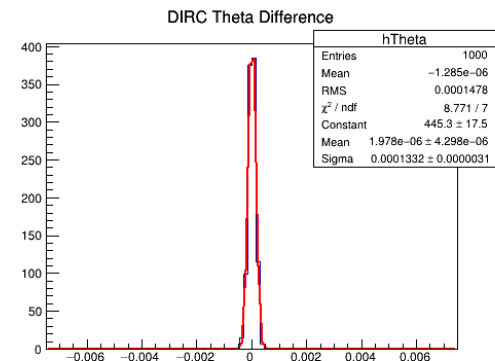
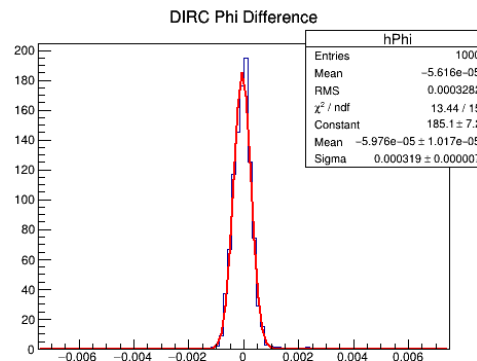
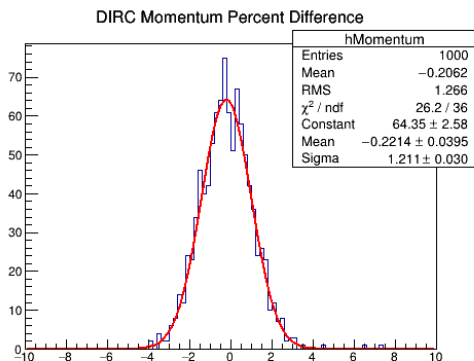


# Tracking Study

What I'm investigating right now:

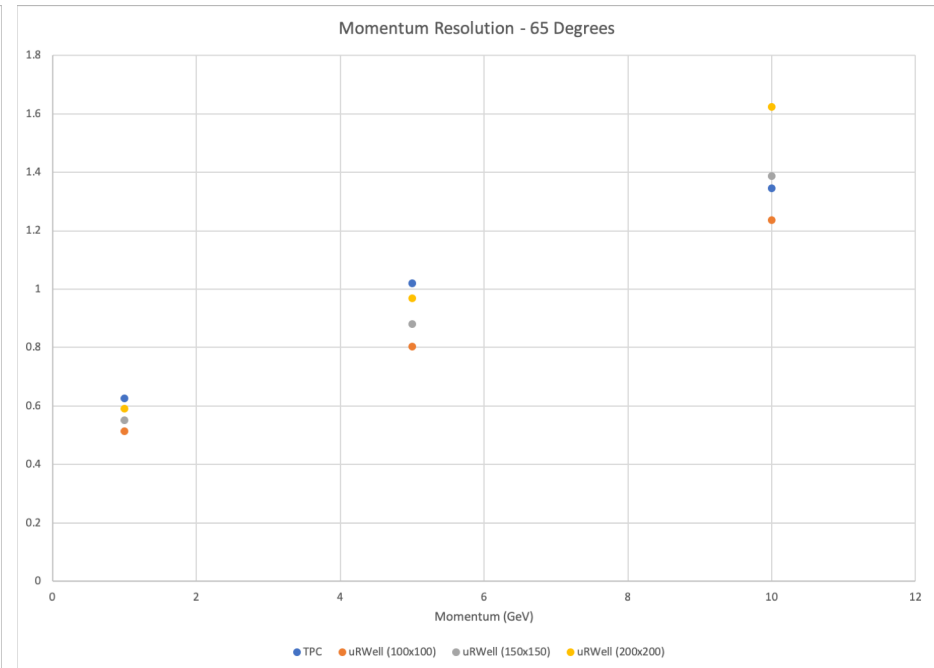
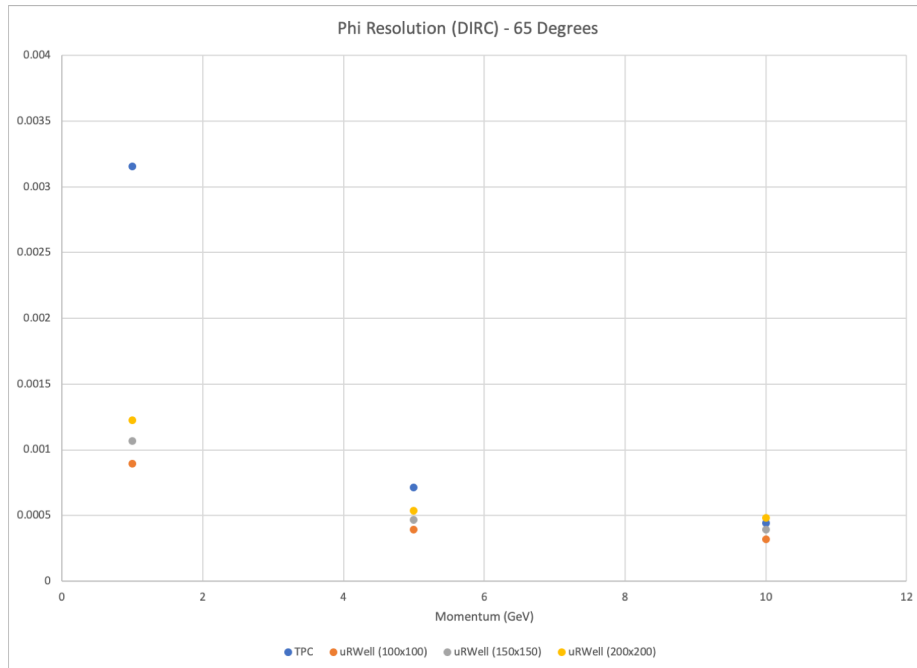
Difference between Monte Carlo Phi and Reconstructed Phi at the DIRC radius and at the IP  
 Difference between Monte Carlo Theta and Reconstructed Theta at the DIRC radius and at the IP  
 Percent difference between the Monte Carlo momentum and reconstructed momentum  
 (not exactly necessary, but done at both locations as well)

*uRWELL – 100umx100um resolution – 10 GeV electrons thrown at 65 degrees*



# Tracking Study

Using the sigma values from the fits to the histograms shown on the previous slides as resolutions I can make comparisons between the different trackers.



So far I am investigating electrons thrown at momentum values of 1, 5, 10 GeV, and angle of 41, 65, 89 degrees.

Using the following trackers: TPC and uRWELL with 100x100, 150x150, 200x200 um res.

Many more plots need to be made, this is just a small sample

# Summary

- Will flesh out the study with more changes in simulation parameters (angles & momenta)
  - Create more plots to investigate the necessary longitudinal/azimuthal hit point resolution of uRWELL shell tracker to match tracking resolution of TPC